

## REMARKS

Claims 1-8, 11, 13-14 and 17-25, 48 and 49 are pending in the application. Claims 9, 10, 12, 16 and 17 have been canceled. Claims 26-47 have been withdrawn from consideration. Claims 1 and 13 have been amended. No new matter has been added. Support for all amendments can be found in the specification as originally filed.

## CLAIM OBJECTIONS

Claims 1-8 are objected to because the status identifier is incorrect. Claim 1 has been amended to removed the underlining. Reconsideration is requested.

## REJECTIONS UNDER 35 USC 103

1. Claims 1, 6-8, 11, 13, 14, 18, 19, 24, 25, 48 and 49 stand rejected under 35 USC 103(a) as being unpatentable over Carr in view of Hirschman, and further in view of Culver. This rejection should be withdrawn in view of the amendments and remarks made here.

The Office Action alleges that :

regarding claim 1, Carr et al disclose a sensor device comprising a microwave antenna element used to detect a change in the level of fluid within tissue of a body (col. 3, lines 30-52), but do not specifically disclose the sensor device comprising a housing having a plurality of bridge segments, the bridge segments connecting at intersections and being arranged to circumscribe an opening defined by the housing and a plurality of elements at least partially seated within the housing at intersections of the bridge segments, each of the plurality of elements comprising a generally plane mounted to a substrate material at a base of the plane, an outer surface of the plane facing away from the substrate, each of the plurality of elements further comprising an electrical shield surrounding the substrate, and at least a first element pair and a second element pair, the first element pair comprising a first transmitting element, a first receiving element, and a first bridging segment, the second element pair comprising a second transmitting element, a second receiving element, and a second bridging segment. However, Hirschman teaches a sensor device comprising a housing having a plurality of bridge segments, the bridge segments connecting at intersections and being arranged to circumscribe an opening defined by the housing (col. 7, lines 49-52; see Fig. 4), and a plurality of elements at least partially seated within the housing at

intersections of the bridge segments, each of the plurality of elements comprising a generally plane mounted to a substrate material at a base of the plane, an outer surface of the plane facing away from the substrate (col.7, lines 49-67 ... col. 8, lines 1-4), each of the plurality of elements further comprising an electrical shield surrounding the substrate (col. 6, lines 39-43; col. 7, lines 62-65), and a plurality of elements comprising at least a first element pair and a second element pair, the first element pair comprising a first transmitting element and a first receiving element, the second element pair comprising a second transmitting element and a second receiving element (col. 2, lines 66- 67 ... col. 3, lines 1-18). Neither, Carr et al nor Hirschman specifically disclose that the first antenna element pair and the second antenna element pair are spaced from each other to create an area of reduced sensitivity between the first antenna element pair and the second antenna element pair. However, Culver et al teach a source and detector setup where a gradient of sensitivity is defined by boundary contours (col. 7, lines 40-51). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to apply the teachings of Hirschman to Carr et al as to provide a well-adapted structure through which to apply extravasation detection, and Culver et al to Carr et al and Hirschman, as to provide differential sensitivity of detection for different geometries of tissue.

Claim 1 has been amended to include that the first antenna element pair and the second antenna element pair are spaced from each other to create an area of reduced sensitivity between the first high sensitivity zone and the second high sensitivity zone. Support for this amendment can be founding the specification as originally filed including in Fig 2 and paragraphs 69-70. Further, Claim 13 includes similar subject matter of an area of reduced sensitivity. Neither, Carr, Hirschman or Culver, either alone or in combination teach or suggest Applicants' invention of Claims 1 and 13. The Office Action correctly indicates that neither Carr nor Hirschman disclose a first high sensitivity zone and a second high sensitivity zone and the first and second antenna element pairs are spaced from each other to create an area of reduced sensitivity. The Office Action alleges though that Culver teaches a source and detector set up where a gradient of sensitivity is defined by boundary contours. However what Culver teaches in Col. 7 lines 40-51 that the contours vary so that there is a higher sensitivity region if in close proximity to contour 62, for example object 64, while object 66 is spaced from sensitivity contour 62 and has less sensitivity (col. 7, 7, lines 55-62). This is very different from Applicants' invention where the first antenna element pair and the second antenna element pair are spaced from each other to create an area of reduced

sensitivity between the first high sensitivity zone and the second high sensitivity zone. Culver teaches away from such structure by having higher sensitivity inside the contours and lower outside the contours (col. 7, lines 47-48). Also, in particular, Fig. 7 discloses that the sensitivity between detectors is not different but the same. This is very different from Applicants' invention where first antenna pair and second antenna pair have reduced sensitivity therebetween. Accordingly, Culver does not teach or suggest Applicants' invention of Claim 1, and neither Carr nor Hirschman in combination of alone seem to remedy these deficiencies. Therefore, Claim 1 is considered to be allowable. Further, Claim 13 included spacing segments, has been amended to include similar subject matter and is therefore also believed to be allowable.

Regarding Claims 6-8, 11, 14, 18, 19, 24, 25, 48 and 49, Claims 6-8, 11, 14, 18, 19, 24, 25, 48 and 49 depend from Claims 1 or 13, either directly or indirectly, and as discussed are believed to be allowable. Further, neither Carr, Hirschman nor Culver, alone or in combination teach or suggest Applicants' invention. Therefore, Claims 6-8, 11, 14, 18, 19, 24, 25, 48 and 49 are also believed to be allowable. Reconsideration of Claims 1, 6-8, 11, 13, 14, 18, 19, 24, 25, 48 and 49 is requested.

2. Claims 2-5 and 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carr et al in view of Hirschman and further in view of Culver et al, as applied to claims 1 and 13 above, and further in view of Cudahy et al. This rejection should be withdrawn in view of the amendments and remarks made herein.

The Office Action alleges that:

Regarding claims 2 and 20, Carr et al disclose antenna elements (col. 3, lines 30-52) and Hirschman discloses the application of RF electrical energy to such elements (col. 7, lines 49-55), but neither Carr et al, Hirschman, nor Culver et al specifically disclose that the RF energy is applied through a cable assembly. However, Cudahy et al teach a cable having a mating terminal electrically connected to electrodes (col. 6, lines 22-24). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to apply the teaching of Cudahy et al to Carr et al, Hirschman, and Culver et al, as to provide a means of delivering RF electrical energy to antenna elements.

Regarding claims 3 and 21, neither Carr et al, Hirschman, nor Culver et al specifically disclose a

flexible circuit board assembly for transmission of energy to and from the antenna elements. However, Cudahy et al teach an electrode assembly mounted to a flexible pad (col. 5, lines 40-53) that is physically connected to a circuit (col. 7, lines 25-29). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to apply the teachings of Cudahy et al to Carr et al, Hirschman, and Culver et al, as to provide circuitry capable of being fit to a patient's geometry.

Regarding claims 4 and 22, neither Carr et al, Hirschman, nor Culver et al specifically disclose a flexible circuit board comprising at least one splitter such that electromagnetic energy can be transmitted to at least two of the plurality of antenna elements using a single transmission trace within the flexible circuit board. However, Cudahy et al teach the transmission of signals to a multitude of electrodes (col. 7, lines 25-29) through a single cable having a mating terminal connected to the plurality of electrodes (col. 6, lines 17-24). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to apply the teachings of Cudahy et al to Carr et al, Hirschman, and Culver et al, as to provide an electrical connection between a plurality of elements through a common cable. Regarding claims 5 and 23, neither Carr et al, Hirschman, nor Culver et al specifically disclose a flexible circuit board comprises at least one combiner such that electromagnetic energy can be received from at least two of the plurality of antenna elements and carded by a single transmission trace within the flexible circuit board. However, Cudahy et al teach the reception of electrical signals from electrode elements and the transfer of the signals through a single cable to a control system (col. 6, lines 17-33). Therefore, it would have been obvious to one of ordinary skill in the art at the time of invention to apply the teachings of Cudahy et al to Carr et al, Hirschman, and Culver et al, as to provide an electrical connection between a plurality of elements through a common cable.

Claims 2-5 and 20-23 depend from either Claims 1 or 13, either directly or indirectly, which as discussed above are believed to be allowable. Further, neither Carr, Hirschman, nor Culver teach or suggest, either alone or in combination, Applicants' invention. Further, Cudahy does not remedy these deficiencies. Accordingly, Claim 2-5 and 20-23 are believed to be allowable. Reconsideration of Claims 2-5 and 20-23 is requested.

## **RESPONSE TO ARGUMENTS**

The Office Action alleges that:

With regard to Claims 11 and 18, Culver does not teach or suggest Applicants' invention of the location of the antenna pairs, namely that 'the space between the first antenna element pair and the second antenna pair is set so that the sensor is insensitive to fluid changes of a predetermined volume within the area of reduced sensitivities...Thus, Culver teaches no differential of sensitivity between a first antenna pair and a second antenna pair...this does not create an area of reduced sensitivity between the first antenna pair and the second antenna pairs': *The teachings of Culver are seen as sufficiently suggestive of*

*creating areas of insensitivities within a specific area relative to transmitters and receivers. For this reason, the rejections are maintained.*

Claim 11 has been amended, and neither Culver, Carr nor Hirschman, either alone or in combination, teach or suggest Applicants' invention. The Office Action alleges that *creating areas of insensitivities within a specific area relative to transmitters and receivers*. However, the specific area relative to the transmitter is the distance away from the receiver and not any relation to an area between two areas of higher sensitivity. Further, Claim 18 disclosed 2 areas of higher sensitivity which Culver, Carr nor Hirschman teach or suggest. Accordingly, Claims 11 and 18 are believed to be allowable and reconsideration is requested.

In view of the above amendments and remarks, Applicants submit that the claims are in condition for allowance and the Examiner would be justified in allowing them.

Respectfully submitted,

By /jill Denesvich/  
Jill Denesvich  
Attorney for Applicants  
Registration No. 52,810